

Enc 1

EDUCATIONAL
PROPOSED PROGRAM IN TECHNICAL INTELLIGENCE

1. Background

Since 1968, the U.S. Navy has faced an increasingly technically sophisticated threat on the high seas. Because of the proliferation of ships and equipment in the Soviet Navy, requirements placed on Naval Intelligence and the U. S. intelligence community at large, for detailed technical information has increased substantially. The Naval Postgraduate School faculty has, therefore, a preliminary curricula for officer education in the area of technical intelligence.

The following paragraphs describe the requirements and give a preliminary curricula description for the Technical Intelligence (T.I.) area.

2. Officer Educational Requirements in Technical Intelligence

The primary military, technical and managerial demands placed on an officer specializing in T.I., depend on the phase of the technical intelligence problem in which he is working. The first phase may be called the data collection and processing phase. The second is the technical data analysis phase.

In the collection phase of the technical intelligence problem, the officer will be required to accomplish the following: Through interface with the operational intelligence group, the technical analysis groups and other parts of the intelligence community, he will be required to frame collection operations. To set up these operations realistically, he must be familiar with technical capabilities of existing and planned collection resumes, platforms, etc., throughout the U. S. intelligence community. In those cases where new recourses are necessary, he must be able to analyze the engineering problems in adequate detail to write top system specifications for new collection recourses. He then must interface with the material agencies to insure engineering and procurement actions meet these requirements. The officer's background must involve photographic systems and electronic systems.

In the analysis phase, the officer must do the detailed technical analyses of the collected data. This involves understanding the conditions of the

collection requirements, generation of hypotheses on technical characteristics of the foreign weapon systems, testing these hypotheses using collected data of all types (photographic and electronic), etc. Fortunately the ideal educational background for this phase of the T.I. problem is essentially the same as for collection phase.

3. Tentative Curricula Characteristics:

Length: 21 months

Prerequisites: BS in Science or Engineering. Those without this background would require some additional time at NPS.

This program is constructed largely from existing NPS courses which support the objectives of a technical intelligence program, although some new courses would have to be developed. This program emphasizes collection and analysis techniques of technical intelligence supported by material which provides the contextual and technical background of technical intelligence. Following approximately one year of course work, the student is expected to undertake an experience tour of approximately one-half a quarter devoted to broadening his appreciation of the problems and requirements of technical intelligence and upon which his thesis may be based. The program structure allows variation in emphasis through course substitution; for example, material on acoustic analysis and collection may be included or omitted as required. Variations may choose additional material from other NPS programs such as Computer Science, Anti-Submarine Warfare, Weapons Systems Science, Operations Analysis, etc. The program features an introductory program designed to meet the needs of the individual student through a package of mini-courses and P.S.I. courses designed to provide appropriate background material for further study.

General features of a typical program are described in terms of principle academic sequences, or tracks. In addition to the experience tour, students will also complete a thesis or group project related to Technical Intelligence and attend a common seminar program with students in the existing Naval Intelligence Program.

Specific tracks are described in the following paragraphs. A curricular table is also included.

a. Technical Intelligence Track

This track is directed toward the education of the student in the methods of analysis and interpretation of technical intelligence. The material is chosen from the areas of signal, imagery, and acoustic analysis and includes both analogue and digital methods. The track includes substantial preparation in signal processing including material on the detection and transmission of imperfect signals, probability, communication systems and theory, and modulation theory.

b. Intelligence Collection Track

This track is directed toward the education of the student in the properties and design of intelligence collection systems. Material covered includes collection systems used against simple and sophisticated electromagnetic radiation systems, the specifications of such systems, conventional and non-conventional imagery systems, engineering interpretation of imagery, and acoustical collection systems.

c. Intelligence Analysis and Security Affairs Track

This track is directed toward providing the student with an understanding of the context of the technical intelligence problem in the larger general intelligence problem. Material covered includes the national and international factors which shape U. S. defense policy, the characteristics of the Soviet System and its role in international security affairs, the development and roles of the Soviet Navy, forecasting methods, and net assessment.

d. Engineering Science Support Track

This track is directed toward the technical education of the students in aspects of engineering and science underlying military systems and their operation. Materials includes computer science, electromagnetic waves and their propagation, electro-optics, modern optics techniques, radar techniques and systems, electronic counter-measures principals and techniques, and underwater acoustics and the oceanographic factors affecting sound propagation in the ocean.

e. Individualized Preparatory Package

A feature of this program is an individually designed block of courses and mini-courses directed toward insuring that each student possesses knowledge

in areas prerequisite for further study. Material for this package will be selected from the following areas: Mathematics, Electrical Engineering, Computer Science, and Atomic Physics.

PROPOSED TECHNICAL INTELLIGENCE PROGRAM (TYPICAL)

TER 1	INDIVIDUAL PREPARATORY PACKAGE			
TER 2		MA 3139 Partial Differential Equations & Transforms for Wave Propagation (IPP)	CS 3200 Structure of Digital Computers (ESS)	GV 2061 National Security Affairs (IASA)
TER 3	PS 3411 Applied Probability Theory (TI)	EE 3118 Communications Systems (ESS)	ST 3180 Electromagnetic Wave Propagation (ESS)	GV 3400 Problems of Gov't and Security in the Soviet Union (IASA)
TER 4	EE 4571 Statistical Communications Theory (TI)	EE 3___ (*) Radar and Electronic Warfare Systems (ESS)	PH 3280 Electro-Optics (ESS)	GV 3420 Soviet Naval & Maritime Strategy (IASA)
TER 5	EE 4482 Signals Intelligence Systems Engineering (IC)	SE 3110 (*) Reconnaissance Systems (IC)	EXPERIENCE TOUR	
TER 6	EE 4483 (*) Signal Analysis (TI)	PH 3431 Physics of Sound in the Ocean (ESS)	THESIS	
TER 7	SE 4111 (*) Image Processing (TI)	EE 4452 Underwater Acoustic Systems Engineering (IC)	GV 4063 Forecasting, Threat Assessment & Net Assessment (IASA)	

NOTES FOR THE PROPOSED TECHNICAL INTELLIGENCE PROGRAM

1. The Individualized Preparatory Package would be a sequence of courses, PSI courses, and mini-courses selected to provide required prerequisite material and renew academic skills. A typical program might include material equivalent to the following courses:

MA 2129 Elements of Linear Algebra, Ordinary Differential Equations
and Fourier Series
CS 2100 Introduction to Computers and Fortran Programming
EE 2107 Introduction to Electrical Engineering
EE 2103 Linear Systems Analysis
PH 2641 Atomic Physics

2. For the student who does not require a background in acoustics PH 3431 and EE 4452 could be eliminated. Typical substitutions might be:

GA 4651 Search Theory and Detection
EE 3422 Modern Communications Systems

or

EE 3410 Continuous and Digital Control Systems
EE 4473 Missile Guidance Systems

etc.

3. For the student who wishes to specialize in acoustic systems the sequences

PH 3280 and SE 3110
PH 3431 and EE 4452

would be interchanged and

EE 3514 Acoustic Signal Processing

would be substituted for SE 4111.

4. The two courses in Quarter 5 would be taught on an accelerated basis for one-half quarter.